Film-Evaporation MEMS Tunable Array (FEMTA) for Propulsion and Thermal Control

Completed Technology Project (2013 - 2016)

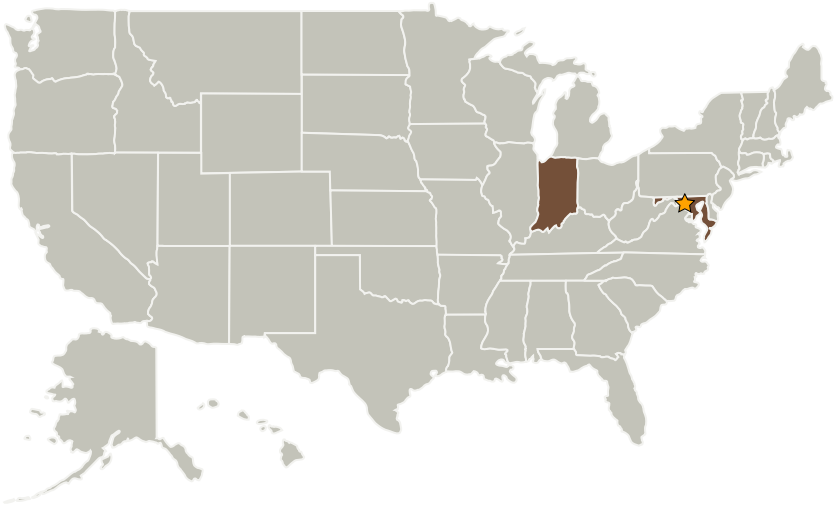
Project Introduction

Film-Evaporation MEMS Tunable Array (FEMTA) exploits micro-scale effects of surface tension to provide a low mass, low power, and compact multi-purpose solution for both propulsion and thermal control. A one-watt FEMTA unit contains thruster/cooler arrays as large as 10 by 10 elements with a total system dry mass of less than 1 gram and a volume less than 2 cubic centimeters, which includes the propellant tank and valves. The design cooling power of a unit is 10 Watts, while the thrust is tunable up to 200 _N with a resolution of 3 _N. The integrated design eliminates the need for peripheral support other than a low-voltage power supply and signaling.

Anticipated Benefits

This technology will enable greater heat rejection for smallsats.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Purdue University-Main Campus	Supporting Organization	Academia	West Lafayette, Indiana

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Primary U.S. Work Locations	
Indiana	Maryland

Project Website:

https://www.nasa.gov/directorates/spacetech/home/index.html

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Spacecraft Technology

Project Management

Program Director:

Christopher E Baker

Program Manager:

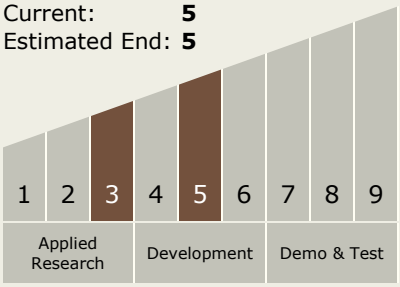
Roger Hunter

Principal Investigator:

Alina Alexeenko

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



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Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.X Other Propulsion Systems

Target Destination

The Moon